Question 16: The document concludes that back-fit exemptions from NRC requirements on decommissioned plants previously granted under the assumption that a zirconium fire was not possible do not "present an undue risk to the public health and safety."

Question 16.a. Does the NRC still agree with this statement?

Answer:

Based upon the current spent fuel decay heat levels (all reactors currently undergoing decommissioning have been shut down for over four years) and heightened security conditions instituted at decommissioning plants since September 11, 2001, the Commission believes that there is adequate protection of public health and safety and, therefore, no need for immediate regulatory action. As a result of the terrorist attacks of September 11, 2001, the Chairman directed the staff to thoroughly reevaluate the NRC's safeguards and physical security programs. This reevaluation will be a top-to-bottom analysis involving all aspects of the Agency's safeguards and physical security programs and will evaluate the threat to decommissioning reactors.

Question 16.b. How is such a conclusion possible, given the document's conclusion that the risk of such a fire cannot be dismissed until the spent fuel is removed from the site, the failure of the analysis to account for the risk of zirconium fires due to sabotage or terrorism, as well as the recommendation the Commission's Safety Goal policy statement (which currently applies only to operating reactors) also apply to decommissioned plants until the spent fuel is removed from the spent fuel pools?

Answer:

The staff's conclusion in its answer to question 16.a above is based on the very low likelihood that an event in which the spent fuel became uncovered after many years of cooling could result in a significant offsite radiological release in conjunction with the judgment that current safeguards protections at the decommissioning plants will reduce the likelihood of successful radiological sabotage.

Question 16.c. Will the NRC revoke its previously granted exemptions in light of the conclusion that the risk of a fire cannot be dismissed, as well as in light of the events of September 11? If not, why not?

Answer:

As stated in SECY-01-0100, "it is the staff's judgment that previously granted exemptions for EP and insurance at currently decommissioning plants do not present an undue risk to the public health and safety given the long time periods available to support implementation of protective or mitigative measures on an ad hoc basis for SFP accidents...." With respect to previously granted safeguards exemptions, the staff's review was not addressed in SECY-01-0100, and is continuing as an aspect of the ongoing top-to-bottom analysis involving all aspects of the Agency's safeguards and physical security programs.

Question 17: The document assumes that "because of the long spent fuel decay times at currently decommissioning plants, a zirconium fire cannot occur for an extended period of time (at least 20 hours), if it could occur at all, even under the worst-case adiabatic heatup assumptions (no heat transfer of any kind from the fuel assemblies)." This statement seems to be premised on an accidental cause of the zirconium fire.

Question 17.a. Would it take 20 hours for a zirconium fire to occur if a terrorist simultaneously drained the coolant and set a fire or caused an explosion? If not, how long would it take in the worst case scenario?

Answer:

The statement that it would take at least 20 hours for a zirconium fire to occur once a spent fuel pool is drained is based on all heat being generated by radioactive decay and exothermic energy released by the oxidation of the zirconium. No external heat source was postulated in arriving at this number. This issue will be encompassed in the staff's reevaluation of security and physical protection programs.

Question 17.b. What is the shortest time a zirconium fire could occur if a large aircraft full of fuel crashed into the spent fuel storage facility?

Answer:

The staff has not estimated the time that would be required to cause a zirconium fire if a large aircraft full of fuel crashed into a spent fuel pool storage facility. This issue will be encompassed in the staff's reevaluation of security and physical protection programs.

Questions on the State of Utah's Petition Related to Security At the Proposed Spent Nuclear Fuel Storage Facility At Skull Valley

Question: 10 CFR section 72.94 requires that a Safety Analysis Report (SAR) must identify and adequately address design basis external man-induced events such as suicide mission terrorism and sabotage "based on the current state of knowledge about such events." Given that the events of September 11 have forever altered our "state of knowledge" about the nature of such threats, do you plan to require PFS to amend its SAR to address the risk of suicide mission terrorism and sabotage? If not, why not?

The State of Utah also contends that PFS's Environmental Report (ER) and the NRC's Draft Environmental Impact Statement (DEIS) are too limited to comply with the National Environmental Policy Act and 10 CFR §§ 72.34, 51.45, 51.61 and 51.71, because they do not adequately identify and evaluate any adverse environmental effects which cannot be avoided from attacks by suicide mission terrorism or sabotage. The State of Utah filing states that "events of September 11th and their aftermath require a change in scope of the ER and DEIS to include an analysis "of Federal policy, including factors not related to environmental quality...[that] are relevant to the consideration of environmental effects of the proposed action." 10 CFR § 51.71 (d)." Do you plan to require PFS to amend it ER in light of the events of September 11? If not, why not? Do you plant to amend the DEIS in light of the events of September 11? If not, why not?

According to the State of Utah, the location of the proposed PFS facility, in the middle of Skull Valley, is surrounded by critical military installations vital to national security -- installations such as the Utah Test and Training Range, Dugway Proving Ground, Deseret Chemical Depot, and the Tooele Army Depot - and only 12 to 15 miles away from commercial jetways, and presents an opportune target for suicide mission terrorism. The transportation of spent nuclear fuel to the proposed facility and casks stored at the Intermodal Transfer Facility (ITF, which is located right underneath a commercial jetway) also present exposed terrorist targets. The facility is about 45 miles from a large metropolitan area, 50 miles from Salt Lake City International Airport, and the ITF will be able to be seen from Interstate 80. What additional measures will NRC require PFS to take to ensure the safety of the spent nuclear fuel, as well as the safety of the surrounding sensitive facilities in the event of an accident or terrorist attack? If not additional measures will be required, please fully justify your decision.

According to the SAR, PFS plans to store spent nuclear fuel in Holtec International HI-STORM 100 Casks. The HI-STORM is designed to withstand an impact of a 1,800 kg (3,968 lb) car moving at a speed of 126 mph (SAR, Rev 17 § 8-2.2.2)... The HI-STORM 100 cask consists of 0.75 inch outside steel liner, 26.75 inches of 4,000 psi concrete, and a 2-inch thick inner steel liner for a total of 29.5 inches. The steel canister is 0.5 inches thick. According to the petition, a U.S. Department of Energy report determined that a Boeing 757 traveling between 422 and 500 miles per hour could penetrate between 28 to 33.6 inches of concrete and between 1.47 and 1.85 inches of steel. Clearly, a Boeing 757 commercial airliner, which on September 11 was traveling at 480

mph or greater, would be able to penetrate the HI-STORM casks and canisters. How will the NRC ensure that the storage casks are protected from an attack such as the one that occurred on September 11?

According to the SAR, PFS plans to transport spent nuclear fuel in a Holtec International HI-STAR 100 shipping cask. The HI-STAR 100 is required to withstand a 30 mph drop onto an unyielding surface (10 C.F.R. § 71(c)(1)), not to withstand a 255,000 pound Boeing 757 traveling 500 miles per hour. How will the NRC ensure that the shipping casks are protected from an attack such as the one that occurred on September 11?

According to the SAR, the Canister Transfer Building (CTB), where the transfer of PFS canisters from shipping casks to storage casks will occur, has two foot thick walls and an eight inch thick roof and is designed to withstand a 3.990 pound car moving at 91 mph. In addition, according to the ER, PFS's proposed Intermodal Transfer Facility (ITF), located 1.8 miles west of Rowley Junction, will consist of a pre-engineered metal shell to provide weather protection, but no additional protection against terrorist attacks. What measures will NRC require PFS to take to ensure that the CTB and ITF are better able to protect against terrorist attacks such as those of September 11? If no additional measures will be required, please fully explain the NRC decision.

According to the SAR, HI-STORM casks are required to withstand a 1,475 °F for 15 minutes, while HI-STAR shipping casks are required to withstand a fire of 1,475 °F for 30 minutes. According to a 1976 Sandia National Laboratories study, jet fuel burns at an average temperature of 1,850 °F, and the fires that resulted at the World Trade Center and Pentagon burned for hours. What actions will NRC take to ensure that storage and shipping casks for spent nuclear fuel can withstand hotter fires of longer duration than 15 minutes? If no actions are planned, please fully explain why not.

The CTB, where the transfer of PFS canisters from shipping casks to storage casks will occur, is designated to withstand a 300 gallon fuel fire for 16 minutes. What actions will NRC take to ensure that this facility can withstand a fire involving more than 20,000 gallons of fuel (the amount typically held in large aircraft)? If no actions are planned, please fully explain why not.

The State of Utah provided some expert calculations related to the amount of radionuclides that would be released into the environment in the event of a commercial airline crash into the proposed spent fuel storage facility. These calculations showed that the consequences of such an event would cause the release of radioactivity at levels far higher than NRC limits for distances of tens of miles. Has NRC verified these calculations? If so, what actions do you plan to take to endure that such an event does not occur? If not, why not?

Answer:

You have posed several questions regarding physical protection and safeguards for the proposed Private Fuel Storage Facility (PFSF), which, if licensed by NRC, would be built on the Reservation of the Skull Valley Band of Goshute Indians. As you are aware, the application from Private Fuel Storage, Limited Liability Company (PFS) to construct and operate the PFSF is being contested before the NRC's Atomic Safety and Licensing Board (ASLB). ASLB decisions are subject to Commission review. Because your questions bear on contested matters in the proceeding, it would be inappropriate for the Commission to respond to them at this time in order to avoid any perception of unfairness to the parties or any intrusion into the integrity of the Commission's adjudicatory processes. *See Pillsbury v. FTC,* 354 F.2D 952 (5th Cir. 1966).

Questions from November 27, 2001 Letter

Questions about NRC and Industry Efforts to Assure the Ability of a Reactor to Withstand the Impact of a Large Airplane

Question 1: Is it true that beginning in the mid-1970s, many NRC engineers responsible for safety design at new plants fought to strengthen the standards so plants would be protected from larger aircraft that were being flown at the time or on the design boards?

Answer:

We have not been able to substantiate the existence of such efforts in the mid-1970s.

Question 2: If so, were such efforts opposed by the nuclear utilities industry?

Answer:

We have not been able to substantiate the existence of such efforts in the mid-1970s.

Question 3: Why weren't the strengthened standards adopted?

Answer:

We have not been able to substantiate the existence of such efforts in the mid-1970s.

Question 4: Please provide copies of all of the NRC engineering reports, studies or memoranda prepared during this period that raise questions or concerns about the ability of nuclear power plants (including but not limited to Seabrook's double containment structures) to withstand the impact of a 747 or a larger aircraft.

Answer:

We were unable to identify any NRC engineering reports, studies or memoranda that raise questions or concerns about the ability of nuclear power plants to withstand the impact of a 747 or larger aircraft.

However, we found a letter from L. Gossick (NRC) to Congressman Robert S. Walker dated August 20, 1979 in which the NRC responded to the Congressman's question number 7 asking whether there is "a 100% insurance, that the reactor building of every nuclear power plant in the U.S. can withstand an accidental airplane crash of a 747 or C-5-A?" The response indicated that the NRC staff guidelines in Standard Review Plan, Section 3.5.1.6 on "Aircraft Hazards," considers nuclear power plants adequately designed against aircraft hazards if the probability of aircraft accidents resulting in radiological consequences greater than the exposure guidelines given in Part 100 of NRC rules and regulations is less than about one in ten million per year. Otherwise, aircraft accidents should be considered in the design of the plant.

The response also states that in most cases, the above acceptance criterion was met. One case where the plant was specifically designed against aircraft hazards is Three Mile Island Unit 1. This is discussed in a July 11, 1973, safety evaluation which states that impact hardening of the Class I structures was achieved by reinforcement of outer walls, thickening of concrete sections, and unique internal features. In addition, special fire protection and ventilation features were provided to cope with aircraft crashes. Similar features were incorporated in Three Mile Island Unit 2.

Question 5: Why did the NRC state first that reactors could withstand the impact of a large aircraft, and then subsequently that no such engineering analysis had ever been performed, if numerous reports had been prepared by NRC staff or NRC contractor or consultants indicating that even the strongest containment system could not survive such an event?

Answer:

As indicated in the answer to question 7 of Chairman Meserve's October 16, 2001 letter to you, aircraft impact effects, in most cases, have not been addressed explicitly with respect to the design features of a nuclear power plant. As a first step in the safety evaluation of a specific nuclear power plant site, potential aircraft crashes are addressed on the basis of the likelihood of an accidental aircraft crash. If the probability of an aircraft crash is found to be sufficiently low, there are no specific design requirements related to the crash effects. Typically, nuclear power plant sites have been screened out from further analysis on the basis of a sufficiently low crash probability. Hence, engineering analyses of aircraft impact effects usually have not been submitted for evaluation for specific sites.

In a few cases, the air traffic in the vicinity of a plant site had been found to be sufficiently high, such that design features had to be provided in order to mitigate the effects of aircraft impacts. For example, Three Mile Island Unit 1 was constructed with special design features to protect its vital areas from crash impact and fire effects with respect to aircraft weighing less than 200,000 lbs. This requirement was imposed since the estimated aircraft traffic density near the site was found to be sufficiently high for aircraft within that size category. For larger aircraft, it was shown that the probability of an on-site crash was sufficiently low, so that specific design features to accommodate the effects of an aircraft weighing more than 200,000 lbs. were not required.

The Argonne report surveys a number of studies concerning aircraft hazards as reported up to about 1982. The studies evaluated in the report cover a wide range of considerations with respect to aircraft crashes, including probabilistic and deterministic models and methods. The report does not present any definitive method of analysis that could be viewed as applicable to all reactor sites and reactor designs. In particular, the report does not contain any discussion of large aircraft crash hazards associated with aircraft such as a Boeing 757 or 767. The report presents a number of conclusions regarding the adequacy of the existing methods of analysis and makes some recommendations regarding potential improvements.

In brief, the NRC addresses aircraft hazards by evaluating the probability of an on-site crash in conjunction with the assumption that the event would lead to plant damage sufficient to cause a release in excess of 10 CFR Part 100 dose guidelines. If the probability is found to be acceptably low, no further requirements are placed on the design of the plant.

Question 6: In your October 16, 2001 letter to me, you stated that "the NRC has not routinely required all plants to be designed to withstand a particular aircraft crash, but such considerations have entered into siting evaluations."

Question 6.a: Which plants has the NRC required be designed to withstand a particular airline crash?

Answer:

The Three Mile Island Unit 1 design was required to have features that protected its vital areas from the impact effects of a 200,000 lb. aircraft. A survey of the Safety Analysis Reports submitted by applicants for a nuclear power plant license indicates that there were no other plants that required design features for withstanding impacts from large aircraft. There were two other reactor sites that were evaluated with respect to aircraft impact consequences for smaller aircraft, namely Limerick and Seabrook. Both of these plants were analyzed for impacts from a 12,500 lb. aircraft. With respect to the remaining sites, the probability of an aircraft impact was either estimated or judged by inspection to be sufficiently low such that the event need not be considered in the design basis. The specific types of aircraft reviews identified in the survey of operating nuclear power reactors are shown in the enclosed table.

Types of Aircraft Reviews

Facility Name / CLOSEST CITY TOWN	Design Basis	See Note A	See Note B
ANO RUSSELLVILLE, AR			X
Beaver Valley MCCANDLESS, PA		X	
Braidwood JOLET, IL		X	
Browns Ferry DECATUR, AL			X
Brunswick SOUTHPORT, NC			X
Byron ROCKFORD, IL		X	
Callaway FULTON, MO		X	
Calvert Cliffs ANNAPOLIS, MD			X
Catawba ROCK HILLS, SC		X	
Clinton CLINTON, IL		X	
Comanche Peak GLENN ROSE, TX		X	
Cooper NEBRASKA CITY, NE			X
Crystal River CRYSTAL RIVER, FL			X
Davis-Besse TOLEDO, OH		X	
D C Cook BENTON HARBOR, MI			X
Diablo Canyon SAN LUIS OBISPO, CA		X	
Dresden MORRIS, IL		X	
Duane Arnold CEDAR RAPIDS, IA		X	
Fermi TOLEDO, OH		X	
Fort Calhoun OMAHA, NE			X
Ginna ROCHESTER, NY		X	
Grand Gulf VICKSBURG, MS		X	
H B Robinson COLUMBIA, SC			X
Hatch BAXLEY, GA		X	
Hope Creek WILMINGTON, DE		X	
Indian Point 2 NEW YORK, NY			X
Indian Point 3 NEW YORK, NY			X

J A FitzPatrick OSWEGO, NY			X
Joseph M. Farley DOTHAN, AL			X
Kewaunee GREENBAY, WI			X
La Salle OTTAWA, IL		X	
Limerick PHILADELPHIA, PA	12.5klb aircraft - 3 buildings		
McGuire CHARLOTTE, NC		X	
Millstone NEW LONDON, CT		X	
Monticello MINNEAPOLIS, MN			X
Nine Mile Point OSWEGO, NY		X	
North Anna RICHMOND, VA		X	
Oconee GREENVILLE, SC			X
Oyster Creek TOMS RIVER, NJ		X	
Palisades SOUTH HAVEN, MI		X	
Palo Verde PHOENIX, AZ		X	
Peach Bottom LANCASTER, PA			X
Perry PAINESVILLE, OH		X	
Pilgrim PLYMOUTH, MA			X
Point Beach MANITOWOC, WI			X
Prairie Island MINNEAPOLIS, MN			X
Quad Cities MOLINE, IL			X
River Bend BATON ROUGE, LA		X	
Salem WILMINGTON, DE			X
San Onofre SAN CLEMENTE, CA		X	
Seabrook PORTSMOUTH, NH	12.5k lb. aircraft - critical structures		
Sequoyah CHATANOOGA, TN			X
Shearon Harris RALEIGH, NC		X	
South Texas Project BAY CITY, TX		X	
St. Lucie Unit 1 FT. PIERCE, FL			X
St. Lucie Unit 2 FT. PIERCE, FL		X	
Summer COLUMBIA, SC		X	
Surry NEWPORT NEWS, VA			X

Susquehanna		X	
Three Mile Island HARRISBURG, PA	200k lb. aircraft at 200 knots - safe shutdown - 9 bldgs Probability of fire considered to be -E-06		
Turkey Point MIAMI, FL			X
Vermont Yankee BATTLEBORO, VT			X
Vogtle AUGUSTA, GA		X	
Columbia Generating Station RICHLAND, WA		X	
Waterford NEW ORLEANS, LA		X	
Watts Bar SPRING CITY, TN		X	
Wolf Creek BURLINGTON, KS		X	

Note A -The licensee reviewed the various aircraft accident scenarios or hazard sources and determined that the probability was sufficiently low (typically less than 1 E-07) that the event need not be considered in the design basis. (56 units on 37 sites)
Note B -The UFSAR did not contain information regarding assessment of either the probability or the consequences of aircraft crash. (43 units on 28 sites)

Question 6.b: What types of airplane crashes are these plants designed to withstand?

Answer:

In the case of Three Mile Island Unit 1, the design requirement was that vital areas would be protected by structures capable of withstanding at worst angle of incidence on the weakest point by an aircraft weighing 200,000 lbs. and traveling at 200 knots.

Question 6.c: What types of design features, structures, systems, components, and shut down features have been required for these plants?

Answer:

In addition to the structural requirements indicated in the answer to 6.b above, fire protection systems were required to cope with the associated fuel that may spill and ignite.

Question 6.d: In light of the September 11th events, does the NRC view these design features, structures, systems, components, and shut down features to be adequate to protect such plants against a hit by a large commercial aircraft?

Answer:

As indicated in the answers to 6.a through 6.c above, in cases where analyses were performed, the design requirements were limited to the accommodation of the crash effects of an aircraft weighing no more than 200,000 lbs. Hence, impacts by larger aircraft have not been addressed. For larger aircraft, a plant-specific analysis would be needed in order to provide estimates of the damage potential.

Question 6.e: In light of the events of September 11th, has the NRC considered requiring other licensees to undertake retrofits to incorporate similar design features, structures, systems, components, and shut down features? If not, why not?

Answer:

As a result of the terrorist attacks of September 11, 2001, the Chairman directed the staff to thoroughly reevaluate the NRC's safeguards and physical security programs. This reevaluation will be a top-to-bottom analysis involving all aspects of the Agency's safeguards and physical security programs and will include a consideration of what physical or procedural modifications are warranted as a result of the attack.

Questions on the June 1982 Argonne National Laboratory Study entitled "Evaluation of Aircraft Crash Hazards Analyses for Nuclear Power Plants"

Question 1: Why did NRC state that "detailed engineering analyses of a large airliner crash have not yet been performed" in its September 21, 2001 press release given that this study was prepared for the NRC and found in NRC's reading room?

Answer:

The Argonne National Laboratory report is an evaluation of the state of the knowledge concerning aircraft crash hazards to nuclear power plants as it existed in 1982. It is a survey and critique of a number of reports and studies that involved probabilistic and deterministic models of aircraft crash hazards.

The report provides a number of recommendations for possible improvements in the regulatory approach to aircraft hazards. These include areas such as site screening methodology and minimum standoff or exclusion distances from airports, airways, and other controlled or restricted air spaces.

None of the studies evaluated in this report involve the detailed engineering analysis of a large aircraft such as the Boeing 757 or 767.

NRC's September 21, 2001, press release indicated that attacks by aircraft such as Boeing 757s or 767s had not been contemplated by the NRC and that nuclear power plants were not designed to withstand such crashes. It is in reference to these aircraft that the NRC further indicated in the press release that detailed engineering analyses of a large airliner crash have not yet been performed.

Question 2: The report concludes that "Aircraft crashes may result in multiple failure initiating events, and a propagating failure originating with a nonsafety system malfunction may be possible." Do you agree with this statement? If not, why not?

Answer:

The report does not develop a definitive technical basis that is supported by detailed analysis and empirical tests that would demonstrate specific occurrences of multiple failures or propagation of failures stemming from nonsafety system malfunctions. It does, however, postulate the possibility of such events and notes that "in none of the reviewed literature have these problems been addressed."

The principal conclusion emphasized in the report is that "aircraft hazards to nuclear power plants are generally very low risk events with respect to 10 CFR 100 radiological exposure guidelines" and that "conclusions and problem areas spelled out in this study need not be cause for alarm although many details cannot be expected to be adequately resolved for at least many years."

The NRC recognizes that aircraft crashes may result in multiple-failure initiating events, and that non-safety system malfunctions could contribute to such events. More detailed discussions of some specific scenarios are presented in the responses to questions 7 through 9 below.

Question 3: The report stated that an NRC Task Force, based on the assumption that a plane crash at a nuclear reactor would be an accidental occurrence, recommended that reactors should only be sited 5 miles or further from airports. The Task Force published its recommendations in NUREG-0625. Did the NRC adopt the task force's recommendation? If not, why not? Are any of the U.S. nuclear facilities located less than 5 miles from an airport? If so, please list them.

Answer:

The NRC Task Force recommended in NUREG-0625 that minimum standoff distances be established for reactor sites with respect to a number of natural and man-made hazards, including major or commercial airports. The Task Force expressed the opinion that an approximate standoff distance with respect to major or commercial airports should be no less than five miles.

As noted in a set of comments on the Task Force report by the Office of Nuclear Regulatory Research (September 4, 1979 Memorandum from S. Levine, Director of Office of Nuclear Regulatory Research to D. Muller, Deputy Director of the Office of Nuclear Reactor Regulation), the recommendations for the standoff distances were made by the Task Force "without presenting any technical analyses to support them." The comment went on to state that "The report would be better without these values until the requisite studies are performed."

The Standard Review Plan (SRP 3.5.1.6, Aircraft Hazards) addresses the hazards associated with airport-related aircraft activities through a set of screening criteria that take airport distance as well as traffic density into account. The standoff distance of five miles is an integral part of these screening criteria.

For nuclear power plants sited within five miles of an airport, we have subdivided the response to provide more specifics. There is only one nuclear plant that is within five miles of a commercial airport, Three Mile Island, which is within 3 miles of Harrisburg International Airport.

There are several plants that are located within five miles of smaller (non-military) airports. For the most part, these airports do not handle commercial air traffic.

Maine Yankee: Wiscasset Municipal is a public airport and is one mile from the plant. Fifty-six general aviation flights use this airport daily.

H.B. Robinson: Hartsville Regional Airport (public) is 2.2 miles away and handles 128 flights per week, mainly general aviation and some military. Twenty-three single- and multi-engine planes are based there.

Limerick: Pottstown-Limerick Airport is a public airport located 2.2 miles from the plant. It serves approximately 119 general aviation flights per day. Pottstown Municipal Airport is five miles from the plant and serves 59 flights per day.
Seabrook: Hamptom Airfield Airport is 4.6 miles from the plant. This is a public, general aviation airport with one turf runway. Sixty-seven single-engine airplanes are based at the airport. Two additional airports are located at 6.5 miles (Cole Farm Airport) and 7.1 miles (Plum Island) from the plant with general aviation traffic.

Wolf Creek: Coffey County Airport is within 4.5 miles of the site. It is a small aircraft airport.

Clinton Power Station: There are two private airports, one at 4.5 miles and one at 4.75 miles from the plant.

Catawba: Rock Hill Airport is a public airport 4.2 miles from the plant. It serves 126 general aviation flights per day.

Dresden: There are two small private airports within five miles.

Brunswick: Brunswick County Airport is a public airport located approximately four miles from the plant. It serves 65 general aviation flights per day.

Palisades: South Haven Area Regional Airport is located 3.6 miles from the plant. It is a general aviation facility used for activities such as business and pleasure flying and for agricultural spraying operations, mostly by light aircraft (1,250 to 5,200 pounds) although 12,500-pound aircraft use it at infrequent intervals.

Kewaunee: Ranch Side Airport is located 3.7 miles from the plant. It is a privately owned airport with one single-engine plane and a turf runway.

Duane Arnold: There are two privately owned airports near the five mile radius: Chain Lakes Airpark at 4.6 miles and Sherman Airport at 5.3 miles. Both have one turf runway and have one single-engine plane based at the airport.

Braidwood: Two privately owned airports within the five mile radius: Rash's Acres at 3.4 miles and Corn Field Airport at 4.6 miles. Both have one turf runway and have one single-engine plane based at the airport.

LaSalle: Two privately owned airports within the five mile radius: Egland Field at 2.5 miles and Spring Brook Airport at 4.3 miles. Both have one turf runway and have one single engine plane based at the airport.

Question 4: The Argonne report states that "A review of past nuclear power plant siting experience indicated that hazards arising from aircraft crashes were analyzed in at least 12 cases in the U.S.A."

a) Please provide copies of all such analyses.

b) What actions, if any, resulted from the analyses performed at these plant. If no actions resulted, why not?

c) Why did NRC state that "detailed engineering analyses of a large airliner crash have not yet been performed" in its September 21, 2001 press release, and in your October 16, 2001 letter to me, given the fact that these analyses apparently existed?

d) Have any subsequent analyses been conducted of this matter? If so, please provide me with copies of such analyses.

Answer:

a) Detailed safety analyses have not been included in most of the safety evaluation reports. Typically, the reports provide only safety evaluation findings and conclusions regarding safety issues such as aircraft hazards.

b) As indicated in the Argonne report, "in the vast majority of the cases, the [aircraft] hazard was excluded on the basis of the statistical data." In other words, in most cases it was possible to show that the probability of a damaging on-site aircraft crash was sufficiently low to make the risk acceptable. Where this was not possible, design features were required to mitigate the effects of the crash (as in the case of Three Mile Island).

c) The September 21, 2001, NRC press release comment, as well as NRC's October 16, 2001, letter to you, refer to a lack of analyses with respect to aircraft such as Boeing 757 or 767. Existing analyses, such as those described in the June 1982 Argonne National Laboratory report, had been made for aircraft of smaller sizes.

d) We have conducted a literature search of relevant documentation that involves aircraft hazard studies and analyses conducted since the 1982 Argonne report. The documents fall into two broad categories, describing probabilistic and deterministic analyses. The scope of the analyses varies widely, ranging from detailed local effects calculations to integral effects of selected aircraft impact scenarios. The enclosure lists the references and abstracts of documents containing aircraft hazard analyses. Since copying all of the references would result in a substantial effort and a relatively large amount of material, we believe it would be more useful to provide a list from which copies of specific documents may be requested.